Amendments to the Claims:

1. (Original) An optical device for achromatizing an input optical beam that includes axially symmetric beam components of different frequencies that span a spectral interval of at least 100 nm, wherein the axially symmetric beam components have respective wavefronts that differ from a uniform plane wave as a function of frequency, the wavefronts having respective root mean square (RMS) differences from the plane wave including a maximum RMS wavefront difference D_{in}, the device comprising:

a first refractive optical element for receiving the input optical beam; and

at least one additional refractive optical element, wherein:

said first and said additional elements are aligned along an optical axis common to all said elements; and

said first and said additional optical elements include surfaces that provide frequency dependent wavefront phase correction to the axially symmetric beam components, so that the input optical beam, upon propagating through said elements, is transformed into an output optical beam that includes axially symmetric beam components having wavefronts whose maximum root mean square (RMS) wavefront difference D_{out} within said 100 nm spectral interval is less than the wavefront difference D_{in}, so that D_{in} is at least 5 times D_{out}.

2. (Original) The device of Claim 1, said surfaces providing wavefront phase correction to axially symmetric beam components that have flat-top intensity profiles.

3. (Original) The device of Claim 1, wherein said optical elements are non-focusing at a given wavelength.

4. (Original) The device of Claim 1, wherein said optical elements are configured so that, upon receiving an input optical beam that includes axially symmetric beam components having respective central intensity portions that together define more than 70% of the total power of the input beam, the axially symmetric input beam components are transformed by said optical elements into respective output beam components having substantially the same uniform intensity profile.

5. (Original) The device of Claim 4, wherein said optical elements are configured so that, when the output beam components include respective central intensity portions, the intensity profiles of the output beam components deviate from each other by no more than 5% over their central intensity portions.

6. (Original) The device of Claim 1, wherein said optical elements are configured so that each of the axially symmetric output beam components has an RMS wavefront difference from the plane wave of less than about 0.06 waves across a 200 nm spectral interval in the visible portion of the spectrum.

7. (Original) The device of Claim 1, wherein said optical elements are configured so that each of the axially symmetric output beam components has an RMS wavefront difference from the plane wave of less than about 0.03 waves across a 200 nm spectral interval in the visible portion of the spectrum.

8. (Original) The device of Claim 1, wherein said spectral interval includes 150 nm in the visible portion of the spectrum.

9. (Original) The device of Claim 1, wherein said spectral interval includes that portion of the visible spectrum extending from 450 nm to 650 nm.

10. (Original) The device of Claim 1, said optical elements including no more than 2 elements that provide wavefront correction.

11. (Original) The device of Claim 1, said optical elements including no more than 3 elements that provide wavefront correction.

12. (Original) The device of Claim 1, said optical elements including no more than 4 elements that provide wavefront correction.

13. (Original) The device of Claim 1, wherein said surfaces are selected so that D_{in} is at least 10 times D_{out}.

14. (Original) The device of Claim 1, further comprising a beam reshaper that receives optical input having frequency components that span a spectral interval of at least 100 nm and that have respective axially symmetric, non-uniform intensity profiles, said beam reshaper transforming the optical input into a substantially flat-top beam that serves as the input optical beam for said device.

15. (Original) The device of Claim 1, wherein said surfaces include spherical surfaces.

16. (Original) The device of Claim 1, wherein all of said surfaces are spherical.

17. (Original) An optical device, comprising:

a beam reshaper for receiving an input beam having frequency components that span a spectral interval of at least 100 nm and that have respective axially symmetric, non-uniform intensity profiles, said beam reshaper having optical components selected to transform the input beam into a substantially flat-top beam;

a first refractive optical element; and

at least one additional refractive optical element; wherein:

said beam reshaper, said first refractive element, and said at least one additional refractive element are aligned along a common optical axis; and

said optical elements have surfaces that introduce respective wavefront phase shifts into the frequency components, so that the input optical beam, upon propagating through said device, is converted into a substantially achromatic output optical beam whose frequency components have a substantially flat-top intensity profile.

18. (Original) The device of Claim 17, said beam reshaper including aspheric optical elements for converting a Gaussian input beam into a beam having a substantially flat-top intensity profile.

19. (Original) The device of Claim 17, wherein said optical elements are configured so that each of the axially symmetric output beam components has an RMS wavefront difference from a uniform plane wave of less than about 0.06 waves across a 200 nm spectral interval in the visible portion of the spectrum.

20. (Original) The device of Claim 17, wherein said optical elements are configured so that each of the axially symmetric output beam components has an RMS wavefront difference from a uniform plane wave of less than about 0.03 waves across a 200 nm spectral interval in the visible portion of the spectrum.

21. (Original) The device of Claim 17, wherein said spectral interval includes 150 nm in the visible portion of the spectrum.

22. (Original) The device of Claim 17, wherein said spectral interval includes that portion of the visible spectrum extending from 450 nm to 650 nm.

23. (Original) The device of Claim 17, said optical elements including no more than 2 elements that provide wavefront correction.

24. (Original) The device of Claim 17, said optical elements including no more than 3 elements that provide wavefront correction.

25. (Original) The device of Claim 17, said optical elements including no more than 4 elements that provide wavefront correction.

26. (Original) The device of Claim 17, wherein said surfaces include spherical surfaces.

27. (Original) The device of Claim 17, wherein all of said surfaces are spherical.

28. (Original) An optical device for receiving an input beam that includes axially symmetric beam components of different frequencies that span a spectral interval of at least 100 nm, the axially symmetric beam components having non-uniform intensity profiles, the optical device generating a substantially achromatic output optical beam, the device comprising:

a first group of optical elements that reshapes the axially symmetric beam components into respective flat-top beams; and

a second group of optical elements in optical alignment with said first group of optical elements, said second group of elements changing the wavefront of said axially symmetric beam components, so that the input beam, upon passing through said first group and said second group of optical elements, is converted into an output beam that is substantially achromatic over said at least 100 nm spectral interval.

29. (Original) The device of Claim 28, said first group including aspheric optical elements for converting a Gaussian input beam into a beam having a substantially flat-top intensity profile.

30. (Original) The device of Claim 28, wherein said second group of optical elements are configured so that the output beam has a maximum RMS wavefront difference from a uniform plane wave of less than about 0.06 waves across a 200 nm spectral interval.

31. (Original) The device of Claim 28, wherein said second group of optical elements are configured so that the output beam has a maximum RMS wavefront difference from a uniform plane wave of less than about 0.03 waves across a 200 nm spectral interval in the visible portion of the spectrum.

32. (Currently amended) The device of Claim 28, wherein said spectral interval includes 150 nm in the visible portion of the spectrum ~~in the visible portion of the spectrum~~.

33. (Original) The device of Claim 28, wherein said spectral interval includes that portion of the visible spectrum extending from 450 nm to 650 nm.

34. (Currently amended) The device of Claim 28, wherein said second group of optical elements includes no more than 2 elements that provide wavefront correction.

35. (Currently amended) The device of Claim 28, wherein said second group of optical elements includes no more than 3 elements that provide wavefront correction.

36. (Currently amended) The device of Claim 28, wherein said second group of optical elements includes no more than 4 elements that provide wavefront correction.

37. (Original) The device of Claim 28, said second group of optical elements including spherical surfaces.

38. (Original) The device of Claim 37, wherein all the surfaces of said second group of optical elements are spherical.